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Two new species of *Phylloporia* (*Basidiomycota*, *Hymenochaetacea*e) from China

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Abstract — The knowledge of *Phylloporia* in China is briefly summarized, and an identification key to the Chinese species in the genus is supplied. Two new species, *P. hainaniana* and *P. oblongospora,* are described and illustrated. The former species is characterized by its triquetrous pileus in section, relatively larger pores (4–6 per mm), and bigger, ellipsoid basidiospores (4.6–5.6 × 3–3.6 µm). *Phylloporia oblongospora* differs from other species in the genus by its homogeneous context, larger pores (2–4 per mm), and oblong ellipsoid basidiospores (4–4.8 × 2–2.5 µm).

Key words — basidiomycetes, polypore, taxonomy, wood-rotting fungi

Introduction

Phylloporia Murrill was defined for annual and monomitic species with duplex context and tiny coloured spores (Ryvarden 1991). However, based on the molecular and morphological study, some perennial and dimitic species were included in the genus, and they all form a monophyletic clade (Wagner & Ryvarden 2002). A modified definition on genus was proposed by Wagner &

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Ryvarden (2002), which includes annual to perennial, monomitic to dimitic species with duplex context and tiny coloured spores. Twelve species are accepted worldwide, most occurring in the tropics (Murrill 1904, Ryvarden & Johansen 1980, Wagner & Ryvarden 2002).

During the study on wood-decaying fungi from southern China, two species of *Phylloporia* could not be identified to any known species. They are described in the present paper as *Phylloporia hainaniana* and *P. oblongospora*. In addition, an identification key to the species of *Phylloporia* occurring in China is provided.

Materials and methods

The studied specimens were deposited in herbaria as cited below. The microscopic procedure follows Cui et al. (2007). In presenting the variation in the size of the spores, 5% of measurements were excluded from each end of the range, and given in parentheses. In the text the following abbreviations are used: IKI = Melzer's reagent, IKI– = negative in Melzer's reagent, KOH = 5% potassium hydroxide, CB = Cotton Blue, CB+ = cyanophilous, CB– = acyanophilous, L = mean spore length (arithmetic average of all spores), W = mean spore width (arithmetic average of all spores), Q = variation in the L/W ratios between the specimens studied, n = number of spores measured from given number of specimens. Sections were studied at magnification up to ×1000 using a Nikon Eclipse E 80i microscope and phase contrast illumination. Drawings were made with the aid of a drawing tube. Special colour terms follow Petersen (1996) and Anonymous (1969).

Taxonomy

Phylloporia hainaniana Y.C. Dai & B.K. Cui, **sp. nov.** Fig. 1

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Carpophorum annuum, pileatum, imbricatum; facies pororum bubalina vel mellea, pori rotundi vel angulati, 4–6 per mm. Systema hypharum monomiticum, hyphae septatae sine fibulis, hyphae contexti 3–8 µm, hyphae tomenti 4–9 µm, setae nullae; sporae flavidae, ellipsoideae, crassitunicatae, 4.6–5.6 × 3–3.6 µm.

Type. — China. Hainan Province, Qiongzhong County, Limushan Nature Reserve, on living angiosperm tree, 23.V.2008 Dai 9460 (**holotype** in IFP).

Etymology — *hainaniana* (Lat.): refers to Hainan, the province name in China.

Fruitbody — Basidiocarps annual, pileate, a few imbricate, broadly attached, soft corky and without odour or taste when fresh, becoming corky when dry; pileus triquetrous in section, projecting up to 0.7 cm, 1 cm broad and 10 mm thick at base. Pileal surface olivaceous buff when fresh, becoming fulvous when dry, azonate, tomentose; margin obtuse, buff yellowish. Poroid surface buff when fresh, becoming cinnamon buff when dry, more or less shining; margin

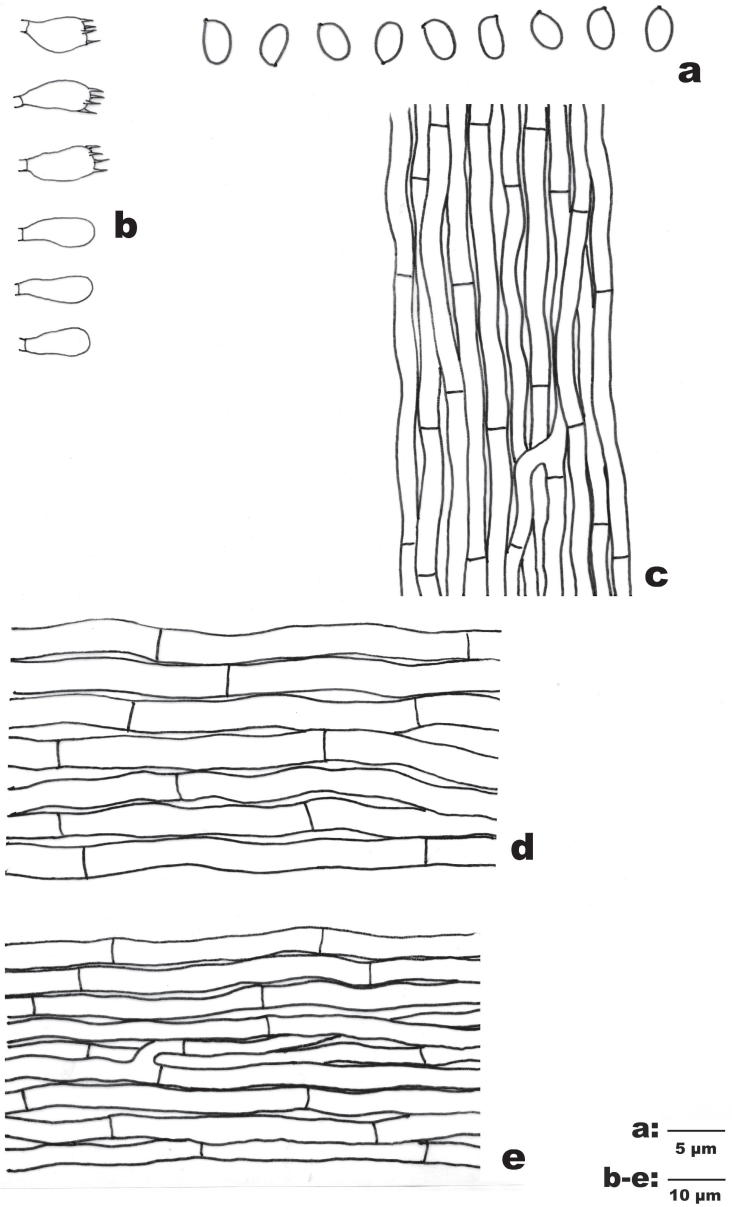

Fig. 1. Microscopic structures of *Phylloporia hainaniana* (drawn from the holotype). a: Basidiospores. b: Basidia and basidioles. c: Hyphae from tube trama. d: Hyphae from tomentum. e: Hyphae from context.

buff-yellow, narrow to almost lacking; pores circular or angular, 4–6 per mm, dissepiments thin, entire to slightly lacerate. Context cinnamon to fulvous, corky, up to 8 mm thick, duplex, a black line present, lower context hard corky, ca. 3 mm thick, upper tomentum soft corky, ca. 5 mm thick. Tubes cinnamon, slightly darker than pore surface, up to 2 mm long.

Hyphal structure — Hyphal system monomitic; all septa without clamp connections; tissue becoming bloody red but otherwise unchanged in KOH.

Context — Hyphae in the lower context pale yellowish brown, thin- to slightly thick-walled with a wide lumen, rarely branched, regularly arranged, 3–8 μm in diam; hyphae of tomentum yellowish brown, thin- to slightly thick-walled with a wide lumen, rarely branched, frequently simple septate, straight, regularly arranged, moderately CB+, some collapsed, 4–9 μm in diam; hyphae in the black zone dark brown, distinctly thick-walled with a narrow lumen, strongly agglutinate, winding and interwoven.

Tubes — Tramal hyphae hyaline to pale yellowish brown, thin-walled, occasionally branched, frequently simple septate, straight, parallel along the tubes, weakly or moderately CB+, 3–5 μm in diam. Setae absent; basidia clavate, with four sterigmata and a simple septum at the base, 13–23 × 4–6 μm; basidioles mostly pear-shaped, slightly smaller than basidia.

Spores — Basidiospores ellipsoid, yellowish, fairly thick-walled, usually bearing a small guttule, more or less collapsed, IKI–, moderately CB+, (4.2–)4.6–5.6 (–6) × (2.8–)3–3.6(–3.9) μm, L = 5 μm, W = 3.11 μm, Q = 1.61 (n = 30/1).

Additional specimen (paratype) examined — **China.** Hainan Prov., Ledong County, Jianfengling Nature Reserve, angiosperm twig, 17.XI.2007 Cui 5160 (BJFC).

Remarks — The pileate basidiocarps with a tomentum, a monomitic hyphal structure, ellipsoid, yellowish, and fairly thick-walled basidiospores, and a growth on living stem of shrub, make the species distinct in *Phylloporia*. The basidiospores of this species (4.6–5.6 × 3–3.6 μm) are the largest so far recorded for the genus, all other species having basidiospores less than 5 μm in greatest dimension (Wagner & Ryvarden 2002).

Phylloporia verae-crucis (Berk. ex Sacc.) Ryvarden has slightly smaller basidiospores (4–4.5 × 3–3.5 μm, Wagner & Ryvarden 2002); however, it sometimes has a laterally stipe, and its pores are distinctly smaller (7–9 per mm, Wagner & Ryvarden 2002). In addition, it lives on soil over buried wood, and occurs in South America (Wagner & Ryvarden 2002).

Following the identification key to the genus by Wagner & Ryvarden (2002), *Phylloporia hainaniana* would be close to *Phylloporia ampelina* (Bondartsev & Singer) Bondartsev, which has brittle and chalky basidiocarps and staining upper surface. In addition, its basidiospores are smaller (3.2–4 × 2.5–2.8 μm), and it grows on *Vitis* and is found so far in Central Asia (Bondartsev 1953).

Phylloporia oblongospora Y.C. Dai & H.S. Yuan, **sp. nov.** Fig. 2

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Carpophorum annuum, pileatum; facies pororum fulva, pori poroundi vel angulati, 2–4 per mm. Systema hypharum monomiticum, hyphae septatae sine fibulis, hyphae contexti 4–6 µm, setae nullae; sporae flavidae, oblongo-ellipsoideae, crassitunicatae, 4–4.8 × 2–2.5 µm.

Type. — China. Guangxi Auto. Reg., Longzhou County, Nonggang Nature Reserve, on living branch of angiosperm tree, 14.VII.2007 Zhou 179 (**holotype** in IFP).

Etymology — *oblongospora* (Lat.): refers to oblong ellipsoid basidiospores.

Fruitbody — Basidiocarps annual, pileate, soft corky and without odour or taste when fresh, becoming corky to fragile when dry, pileus circular, projecting up to 2 cm, 3 cm broad and 5 mm thick at base. Pileal surface yellowish brown when dry, concentrically zonate, velutinate to smooth; margin sharp, concolorous to pileal surface. Poroid surface fulvous brown when dry; margin buff-yellow, up to 2 mm wide; pores circular to angular, 2–4 per mm, dissepiments very thin, strongly lacerate. Context cinnamon buff, soft corky, thin, up to 1 mm thick, homogeneous. Tubes concolorous to pore surface, slightly darker than context, up to 4 mm long.

Hyphal structure — Hyphal system monomitic; all septa without clamp connections; tissue becoming bloody red but otherwise unchanged in KOH.

Context — Contextual hyphae pale yellowish, thin- to fairly thick-walled with a wide lumen, occasionally branched, frequently septate, more or less flexuous, loosely interwoven, 4–6 µm in diam.

Tubes — Tramal hyphae hyaline to pale yellowish, thin-walled, rarely branched, frequently simple septate, more or less straight, subparallel along the tubes, 2–4 µm in diam. Setae absent; basidia clavate, with four sterigmata and a simple septum at the base, 10–15 × 4.5–5.5 µm; basidioles in shape similar to basidia, slightly smaller.

Spores — Basidiospores oblong ellipsoid, slightly curved, yellowish, fairly thick-walled, smooth, IKI–, moderately CB+, (3.9–)4–4.8(–4.9) × (1.9–)2–2.5(–2.6) µm, L = 4.33 W = 2.15 µm, Q = 2.01 (n = 30/1).

Remarks — *Phylloporia oblongospora* is characterized by an annual growth, homogenous context, large pores, and oblong ellipsoid basidiospores. It has homogenous context, which is exceptional in *Phylloporia;* however, its hyphal structure, basidiospores, and living environment fit the genus well.

Phylloporia oblongospora and *P. fruticum* (Berk. & M.A. Curtis) Ryvarden share very similar pore morphology, but the latter species has distinct duplex context and especially broadly ellipsoid to subglobose basidiospores (3–4.5 × 2.5–3 µm, Wagner & Ryvarden 2002).

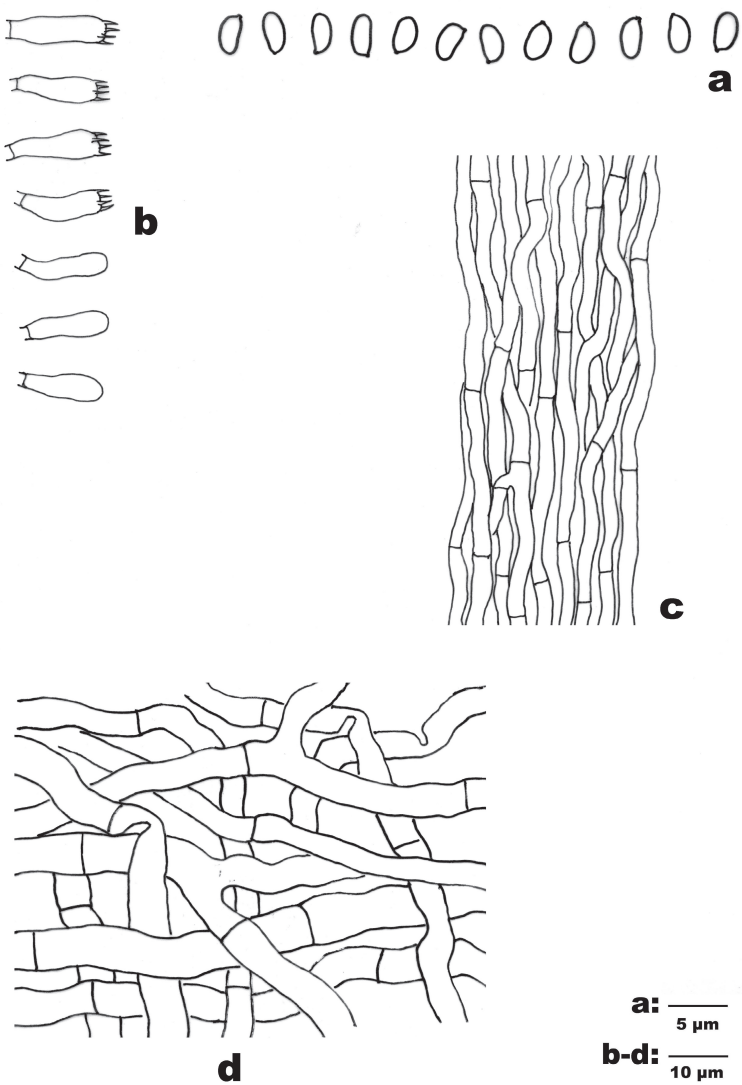

Fig. 2. Microscopic structures of *Phylloporia oblongospora* (drawn from the holotype). a: Basidiospores. b: Basidia and basidioles. c: Hyphae from tube trama. d: Hyphae from context.

So far, six species in *Phylloporia* have been recorded from China (Dai 1999, Dai et al. 2007a, b, Li et al. 2007, Cui et al. 2008). An identification key to the species of *Phylloporia* occurring in China is provided as following.

Key to species of *Phylloporia* in China

(spore dimensions are provided after species names)

1. Basidiocarps perennial, margin acute, hyphae in the upper tomentum acyanophilous 2
1. Basidiocarps annual, margin obtuse, hyphae in the tomentum moderately cyanophilous 3
2. Pores 6–8 per mm, hyphal system dimitic, cystidioles present . . . . . *P. ribis* (Schumach.) Ryvarden
   (2.8–)3–3.8(–4.1) × (1.9–)2–2.6(–2.7) µm,
   L = 3.51 µm, W = 2.22 µm, Q = 1.34–1.58 (n = 60/2)
2. Pores 8–11 per mm, hyphal system monomitic, cystidioles absent . . . . . *P. pectinata* (Klotzsch) Ryvarden
   (2.4–)2.7–3.3(–3.6) × (1.9–)2–2.5(–2.8) µm,
   L = 2.96 µm, W = 2.21 µm, Q = 1.33–1.35 (n = 60/2)
3. Pores 2–4 per mm, context homogeneous; basidiospores oblong ellipsoid . . . . . *P. oblongospora*
   (3.9–)4–4.8(–4.9) × (1.9–)2–2.5(–2.6) µm,
   L = 4.33, W = 2.15 µm, Q = 2.01 (n = 30/1).
3. Pores 4–9 per mm, context duplex, basidiospores ellipsoid 4
4. Pores 4–6 per mm, basidiospores > 4.6 µm in length . . . . . *P. hainaniana*
   (4.2–)4.6–5.6(–6) × (2.8–)3–3.6(–3.9) µm,
   L = 5 µm, W = 3.11 µm, Q = 1.61 (n = 30/1)
4. Pores 6–9 per mm, basidiospores < 4.6 µm in length 5
5. The tomentum up to 1.5 cm thick, concentrically zonate, hyphae of tomentum 5–9 µm in diam, tramal hyphae distinctly thick-walled, infrequently septate . . . . . *P. weberiana* (Bres. & Henn. ex Sacc.) Ryvarden
   (3–)3.4–4.1(–4.5) × (2–)2.2–3(–3.2) µm,
   L = 3.76 µm, W = 2.52 µm, Q = 1.49 (n = 30/1)
5. The tomentum up to 0.5 cm thick, azonate, hyphae of tomentum 4–6 µm in diam, tramal hyphae fairly thick-walled, frequently septate . . . . . *P. bibulosa* (Lloyd) Ryvarden
   3.1–)3.5–4.6(–5) × (2.1–)2.3–3.2(–3.7) µm,
   L = 4.12 µm, W = 2.74 µm, Q = 1.44–1.57 (n = 60/2)

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